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METEOROLOGY OF JAPAN.

From Observations made in Yokohama from 1863 *to* 1869, *inclusive, by* J. C. HEPBURN, ESQ., M.D.

[From the "Japan Weekly Mail," June 27th, 1874.*]

THE city of Yokohama is situated in lat. 35° 26′ N., and long. 139° 39′ East from Greenwich. It lies on the west side of the bay of Yedo; about 37 miles from Cape King, the nearest point on the Pacific, and about 20 miles from Yedo, which is at the head of the bay. The bay at Yokohama is about 12 miles wide. The city is for the most part built upon a plain about from two to ten feet above high water mark, at the mouth of a valley opening on the bay. The valley is about a mile wide, and extends back in a westerly direction some three miles, gradually narrowing to a quarter of a mile. It is bounded on each side by a low range of ills, about 120 feet high. It is cultivated in paddy fields, is consequently wet and marshy, and is exposed to the sweep of N.E. and easterly winds from across the bay, and to S.W. and westerly winds through the valley.

The climate of the Japan Islands generally is much influenced by their position being on the edge of, and even within, the great ocean current called *Kuro-shino*, which flows from the equatorial regions in a northerly and easterly direction.

The N.E. and S.W. monsoons which blow with so much regularity on the coast of China are not much felt on the coast of Japan: the winds being at all seasons exceedingly irregular, frequently violent, and subject to sudden changes. The N.E. and easterly winds are generally accompanied with rain, with a high and falling barometer, and are usually not violent. The S.W. and westerly are generally high, often violent, and accompanied with a low barometer. It is from the S.W. that the cyclones almost invariably come, with one, and sometimes two, of which we are visited yearly. On clear and pleasant days, which are in excess of all others, there is a regular land and sea breeze at all seasons. As may be seen from the Table, the rainfall is above the average of most countries, varying much, however, from one to another. About two-thirds of the rain falls during the six months from April to October.

The steady hot weather, when it is considered safe to change to

* Copy kindly forwarded by H. St. John Joyner, Esq.

light summer clothing, does not generally set in before the latter decade of June or first of July, and ends often very abruptly about the middle of September.

The snow-fall is for the most part very light, not often exceeding two or three inches; though on one occasion, in the winter of 1861, it fell to a depth of 20 inches.

The ice seldom exceeds one inch or an inch and a half in thickness. Fog is rarely noticed; hail is also rare.

Thunderstorms are neither frequent nor severe. Earthquake shocks are frequent, averaging more than one a month; but hitherto since the residence of foreigners in Yokohama no very severe or dangerous shocks have occurred.

The Fall of Rain in Inches.

Year.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Amount
1863...	3·65	2·25	5·90	5·34	5·64	1·40	2·75	7·76	7·16	4·10	3·44	1·17	50·56
1864...	·83	1·92	2·01	9·37	4·10	9·11	4·48	5·71	17·83	3·97	4·47	7·64	71·44
1865...	1·30	6·59	2·47	7·07	4·47	6·29	9·52	3·11	5·32	6·71	1·97	5·90	60·72
1866...	1·81	3·53	4·45	6·16	3·73	7·69	5·84	7·81	10·08	3·15	4·69	6·22	65·16
1867...	2·35	1·81	2·18	6·53	4·40	8·52	1·31	·34	7·50	2·29	2·00	3·39	42·62
1868...	4·52	2·62	6·69	4·82	10·24	17·96	24·04	17·05	19·27	11·62	2·21	1·63	122·67
1869...	1·98	2·32	11·69	6·90	8·10	6·35	9·58	5·17	4·19	16·64	5·41	·84	79·17
Averge	2·35	3·01	5·04	6·59	5·81	8·19	8·22	6·71	10·19	6·92	3·46	3·82	70·33

The Number of Rain Days.

Year.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total No.
1863...	5	5	10	11	10	7	8	12	13	8	9	4	102
1864...	5	8	8	12	9	11	6	9	15	5	5	7	100
1865...	1	9	8	11	8	16	18	7	14	6	8	4	110
1866...	3	7	11	11	12	12	11	9	12	1	5	3	97
1867...	8	3	4	11	9	10	8	2	11	4	4	4	78
1868...	4	6	11	9	7	18	12	16	9	13	4	5	114
1869...	5	5	7	3	4	5	7	10	9	12	11	3	81
Averge	4·4	6·1	8·4	9·7	8·4	11·3	10·0	9·3	11·9	7·0	6·6	4·3	..

Monthly and Yearly Average of the Thermometer.

Year.	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Yearly Av'rage
	deg.	deg.	deg.	deg.	deg.	deg.	deg.	deg.	deg.	deg.	deg.	deg.	deg.
1863...	40·1	41·0	49·0	55·0	64·0	72·0	80·0	82·0	69·0	60·0	53·0	42·0	59·0
1864...	35·5	38·1	43·3	57·4	64·0	69·1	76·5	79·6	70·4	62·6	52·1	44·3	58·0
1865...	39·3	44·5	46·4	58·6	65·4	71·1	73·0	80·2	72·5	61·3	51·2	44·5	59·1
1866...	39·5	38·6	48·0	54·3	61·3	65·5	74·1	77·5	68·2	61·6	50·6	42·3	57·0
1867...	42·3	39·4	49·5	56·2	64·1	70·6	76·0	80·4	71·5	63·6	51·4	45·6	59·3
1868...	42·3	41·3	45·5	57·3	65·5	69·4	77·0	75·3	70·5	60·5	53·3	45·0	58·5
1869...	42·5	45·4	46·4	53·5	63·4	69·2	71·3	75·4	73·1	62·4	51·2	41·3	58·1
Averge	40·2	41·2	46·9	56·0	64·0	69·6	75·4	78·6	70·7	61·7	51·8	43·6	58·4

The Monthly Maximum and Minimum of the Thermometer.

	1863.		1864.		1865.		1866.		1867.		1868.		1869.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	deg.	deg.	deg.	deg.	deg.	deg.	deg.	deg.	deg.	deg.	deg.	deg.	deg.	deg.
January	54	29	58	20	62	25	57	25	59	29	56	28	64	28
February	52	28	47	20	66	32	63	23	52	29	54	25	59	31
March	67	32	65	25	69	33	63	34	66	35	66	31	67	34
April	72	44	71	40	74	48	73	42	73	38	77	40	66	39
May	78	50	77	50	78	46	77	35	76	51	77	52	76	50
June	87	54	81	51	82	58	82	51	80	61	84	59	77	59
July	90	67	89	70	86	64	86	57	88	61	87	66	84	62
August	89	71	89	70	91	70	87	66	90	71	84	65	86	64
September	86	60	86	59	86	55	81	58	89	59	82	60	85	63
October	71	50	76	47	77	48	72	48	75	40	75	45	73	52
November	68	40	69	37	68	32	72	31	70	34	66	35	67	34
December	59	21	68	30	67	27	56	26	59	31	57	32	60	26

THE BRITISH ASSOCIATION AT BELFAST.

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REPORT OF THE UNDERGROUND TEMPERATURE COMMITTEE.

Professor Everett said that during the past year a fresh series of observations has been received from the great well at La Chapelle, Paris, which is 660 metres deep in its present stage, and 1·35 metre in diameter in the smallest part. They show the temperature at the bottom to be 76 deg. F., whereas the former series made it 83¼ deg. F. The difference arises from the fact that when the former series were taken, the boring tool had been at work up to within a week of the observations, whereas the last series were taken when the water had been left undisturbed for a year; and had, therefore, had time to lose the extra heat due to the percussion of the tool. At the depths of 100, 200, 300, 400, 500, and 600 metres, the temperatures, according to the new observations, are respectively—59·5, 61·8, 65·5, 69·0, 72·6, and 75·0; whereas the permanent temperature in the caves under the Paris Observatory, at a depth of 28 metres, is 53·1. A very valuable set of observations has been received from a mine 1,900 ft. deep, at Pzibram, in Bohemia. The temperatures at the depths of 68, 299, 621, 939, 1,290, 1,414, 1,652, and 1,900 feet are respectively—47·9, 48·8, 50·7, 57·8, 58·3, 59·4, 61·2, and 61·4 F. The rate of increase shown by these numbers is unprecedentedly small, being on the average only 1 deg. F. for 135 feet. Observations have also been received from two of the mines of the Société Cockerill, at Seraing, in Belgium. At the depths of 232, 310, and 505 metres, the temperatures are respectively 77, 78, and 87 F. The temperature of the ground at Brussels, which is about fifty miles distant, and about ten miles further North, is known to be 53·6 F., at a depth of from 12 to 24 feet. If we assume a temperature of 54 F. at the depth of five metres at Seraing, we have an increase of 33 deg. in 500 metres, which is at the rate of about 1 deg. in fifty feet. A few observations have come to hand from the Australian gold fields, but they are not sufficiently complete to justify any definite inference regarding the rate of increase. Three thermometers have been sent to the Smithsonian Institution, Washington, at the request of Professor Henry, and will be employed in the observation of temperature in some Artesian wells near Chicago.

THERMOMETRIC EXPERIMENTS.

Mr. G. J. Symons exhibited a series of fourteen very carefully made thermometers, all differing either in the size or shape of the bulbs, or in the material with which they were filled, some being filled with mercury and some with alcohol. They had been specially constructed with a view to testing the relative sensitiveness of different patterns and sizes. The results of the experiments had been printed in the *Quarterly Journal* of the Meteorological Society, and were as follows :—(1) That very large spherical mercurial bulbs are very little better than those filled with alcohol, but that with ordinary and small bulbs mercury is much more sensitive. The new minimum thermometers (the bifurcated and the double cylinders), introduced respectively by Mr. Casella and Mr. Hicks, were highly praised. Mr. Symons said that he brought them before the section mainly in order to offer the loan of the entire series to any experimentalist with more leisure than himself, and who would develop and complete the inquiry which he had begun.

DEEP SEA TEMPERATURES.

Mr. Negretti exhibited a very clever invention in connection with thermometers for ascertaining deep sea temperatures. An ordinary deep sea minimum thermometer will register the lowest temperature through which it passes, so that if a layer of water above the bottom of the ocean is colder than the water quite at the bottom the temperature of the deepest water cannot be ascertained. But by his invention, mechanical apparatus made the thermometer at any desired depth turn over, and discharge all the mercury above a certain level into another arm of the tube, whence the temperature at the instant of reversal could afterwards be observed.

Mr. Symons, the Chairman, and others agreed that it was a remarkably ingenious invention, and as far as they could see faultless.

SOLAR PHYSICS.

Colonel Strange, F.R.S., read a paper advocating solar observations at the Government expense, to ascertain whether the light and heat emitted by the sun are uniform, or so variable as to affect the seasons.

METEOROLOGY OF BANBRIDGE.

Mr. John Smyth, M.A., read a paper on "The Meteorology of Banbridge and the Rainfall of Ulster." This meteorological station is situated in the valley of the River Bann, twenty miles from its source, in lat. 54° 23′ N., long. 6° 18′ W., and 200 feet above sea level. The meteorological instruments are made by Negretti and Zambra, and are of the most approved construction. They have been tested by the standards at Greenwich. Meteorological observations were commenced in 1861, and since carried on without intermission. They are published quarterly by the Meteorological Society, and, through Mr. Glaisher, by the Registrar-General of Births, Deaths, and Marriages. Tables of the results of these observations and diagrams of the thermometer-stand and rain-gauge were exhibited, whence it appeared that the mean pressure of the atmosphere at Banbridge for ten years is 0·133 in. less than that of Greenwich for thirty-two years; that June has the highest mean monthly pressure and January the lowest. The year 1870 shows the highest mean annual pressure, and 1872 the lowest.

The mean temperature of the air is 48°·0 or 1·2 below that of Greenwich. For fifteen years July has the highest mean monthly temperature, viz., 59·2, or 2·5 below Greenwich. January has the lowest—38·4, or 0·3 higher than Greenwich. February is 2·0 deg. higher at Banbridge than at Greenwich. The Winters are, therefore, warmer, and the Summers cooler, than at Greenwich.

The highest reading was 83°, on August 4th, 1868; the lowest, 1°, on January 3rd, 1867.

The prevailing wind has been from the South, and the least frequent from the East.

The mean rainfall for the ten years from 1862 to the end of 1871 has been 29·2 inches. October is the wettest, and June the driest month of the year. The year 1872 is the wettest recorded, the amount being 46·6; and 1864 the driest (25·1). The greatest fall in twenty-four hours was 2·3, October 12th, 1865. The mean evaporation is 15·6 in. At the Bann Reservoir, lat. 54° 15′ N., long. 6° 2′ W., height above sea 440 feet, the mean rainfall was 46 in. The wettest year was 1866 (54·6), the driest 1869 (28·9). The rainfall for the exceptional year 1872 was 61·2, and the greatest fall in twenty-four hours (3·3) on October 29th, 1865.

I ceased to observe Ozone in 1873, as I found when the same volume of air was examined by means of an aspirator the same amount was registered, except in a heavy fog. I was led to expect this from finding the intensity of the wind correspond with the intensity of Ozone.

THE VELOCITY OF THE WIND.

Mr. R. H. Scott F.R.S. read a paper showing how local causes, such as houses and hills, interfere with accurate registration of the force and direction of the wind, and how desirable it is to have observing stations on the tops of mountains, the expense being the impediment. Mr. Warren de la Rue had invented an anemometer, which would indicate results at a distant place by electricity, and this would save the expense of salaries of observers on the hill tops, if the apparatus itself could be preserved from damage by mischievous people.

REPORT OF THE COMMITTEE ON THE INFLUENCE OF FORESTS ON RAIN.

Professor Cunningham read, in the Botanical Section, a report from the Committee, on the Influence of Forests on Rainfall, which consisted of Professor Balfour (chairman), Dr. Cleghorn, Mr. Robert Hutchison, Mr. Alexander Buchan, and Mr. John Sadler. It appeared from the very elaborate report that the operations of the Committee during the past year had been restricted to making meteorological observations at Carnwath, Lanarkshire. In order to carry on these observations and extend them, a grant from the Association of not less than £25 would be required for next year. They did not propose to commence observations at any new station.

Mr. G. J. Symons said that he had attended that section in order to ascertain how far the Committee had acted up to the suggestion made last year that they should enlarge the scope of their enquiry (not of their observations) by extending it to other countries where clearances of vast extent had been made within living memory and by comparisons instituted, for instance, between the present and past discharge of some of the great American rivers. While acknowledging the pains Mr. Buchan had taken with the report, he felt bound to repeat what he said last year, that the way in which the subject was being treated by the Committee was, in his opinion, neither worthy of themselves nor of a matter of such high importance.

Prof. Balfour, F.R.S., was understood to support the views of the previous speaker.

The President (Dr. Hooker, Pres. R.S.) said that although they were much obliged by the report, it evidently did not properly come within the province of that section, and he recommended Professor Balfour to take it to the Physical Section, and there have it fully discussed.

ON THE APPARENT CONNECTION BETWEEN SUN-SPOTS AND ATMOSPHERIC OZONE, BY T. MOFFAT, M.D., F.G.S., ETC.

At the last meeting of the British Association, Mr. Smith, of Birmingham, gave me a record of the number of new groups of Sun-spots which had appeared in each year for a number of years, and he asked me to compare the mean daily quantity of ozone in each year with the number of groups. I have done so, and

in the following table I have given the mean daily quantity of ozone for nineteen years (1851-1869) with the number of groups.

Years.	Total number of new groups of spots which have appeared in each year.	Mean daily quantity of Ozone.	Total new groups arranged in order of number.	Corresponding mean daily quantity of Ozone.	
1851	141	2·6	224	1·9	
1852	125	1·9	211	2·1	
1853	91	2·0	205	2·2	
1854	67	3·4	204	1·9	
1855	28	·8	202	1·5	Mean, 2·2
1856	34	·7	166	2·6	
1857	92	1·1	141	2·6	
1858	202	1·5	130	2·0	
1859	205	2·2	125	1·9	
1860	211	2·1	124	3·5	
1861	204	1·9	101	1·7	
1862	166	2·6	98	1·1	
1863	124	3·5	93	2·4	
1864	130	2·0	91	2·0	
1865	93	2·4	67	3·4	Mean, 1·7
1866	45	1·7	45	1·7	
1867	25	1·5	34	·7	
1868	101	1·7	28	·8	
1869	224	1·9	25	1·5	
			Mean, 122	2·0	

It would appear from these figures that the maximum of Sun-spots gives a maximum of Ozone, and that the minimum of Sun-spots gives the minimum of Ozone. The years 1854 and 1863 appear to be exceptional. In 1854, however, Ozone observations at Hawarden were suspended for three months, which may account for the irregularity in that year. There is, I think, in these results, sufficient to induce others to observe.

REPORT ON THE RAINFALL OF THE BRITISH ISLES FOR THE YEARS 1873-74.

By a Committee consisting of :—C. BROOKE, F.R.S., Chairman, J. GLAISHER, F.R.S., J. F. BATEMAN, C.E., F.R.S., T. HAWKSLEY, C.E., C. TOMLINSON, F.R.S., ROGERS FIELD, C.E., G. J. SYMONS, Secretary.

THE attention of your Committee during the past year has been mainly directed to completing work previously commenced, and to the carrying out of all measures likely to tend to still greater accuracy on the part of the observers.

Position Returns.—It will be in the recollection of the Members of the Association, that as a partial substitute for the expensive, although most important, practice of personal inspection of rain gauge stations by our Secretary, we issued in 1872 to every observer a blank form, on which he was to send full particulars respecting the position of his rain gauge. A specimen of this form is given in our 1871 report p. 99. Upwards of 800 were duly filled up by the observers, and returned to our Secretary, and they have all during the past year been examined and reduced to the compact form shown on page 259 of our last report. The number is, however, so great that they would occupy nearly 100 pages of the annual volume, even if further condensed, and the utmost economy of space exercised. Your

Committee, therefore, although fully impressed with the great value of the information which they have thus obtained, do not insert them in the present report, which is necessarily rather heavy from other causes, and reserve them for next year, when these causes will be absent.

Examination of Rain Gauges in situ.—Your committee have always regarded this as the most important branch of their work. Only those who have personally inspected large numbers of stations can realize fully the variety of details which it is the duty of an inspector to notice, and have rectified. It is worse than useless to collect masses of statistics, unless, at the same time, every effort is made to ascertain that the observations have been in *all* respects properly made. It is therefore with much pleasure that we are able to state that the number of stations visited by our Secretary in the preparation of our last report is 50, being, as will be seen by the following table, considerably above the average.

Number of stations inspected and rain gauges tested *in situ* :—

1862	51	1867	50	1872	24
1863	44	1868	40	1873	27
1864	20	1869	115	1874	50 (to August 12th).
1865	17	1870	39		
1866	60	1871	21		

The total number tested up to the present time is 558, and they are tolerably well scattered over Great Britain, as is shown by the accompanying map, whereon the locality of each station which has been visited by our Secretary is marked by a red disc. We can only once more express our regret that the limit of our grant prevents our providing that which the present system of rainfall observation imperatively requires, viz.: one permanent travelling inspector. The results of the inspections since December 4th, 1872, are given in the appendix to this paper. We are glad to state that a steady approach towards accuracy appears to prevail amongst observers, and also a firm conviction that if it is to be attended to at all it should receive very careful attention.

List of Stations.—In our last report we stated that we hoped "at an early date to present a revised edition of the list of stations published in the reports of this Association for 1865," which, mainly in consequence of the work under the auspices of your Committee, had become obsolete, as it does not contain more than two-thirds of the data now collected. This work, though mentioned last year for the first time, has been in progress under the supervision of our Secretary for upwards of five years, and is now in a forward state, and will form a remarkably complete index of all rainfall observations ever made in this country, and a voluminous one too, for it will occupy 60 or 70 pages of the annual volume, instead of less than 50 pages, which was the case with the last one.

Gauges in the Eastern Lake District.—In the autumn of 1866 thirteen gauges were placed in the watersheds of Ullswater, Haweswater, Easedale Tarn, &c., by Mr. Symons. These were transferred to your Committee in 1869, and the observations continued at their expense. At their meeting in September 14th, 1873, the Secretary reported that seven years had elapsed since their erection, that several of them were out of order, and new observers were in charge of others, concerning which personal instruction was desirable. Thereupon he was directed to take such steps as he thought expedient for securing accurate observations, at a moderate cost. The following is an abstract of his report :—

"The returns from Wet Sleddale have at all times been sent with great irregularity, and for two years none have been received. As a new station had been organized at Shap, that at Wet Sleddale was abandoned. If, however, a good position and a good observer could be obtained in the Sleddale valley, it would be very advantageous.

"At Mardale Green the gauge was found to be in perfect order, but the measuring rod had been broken, and clumsily mended. A new one was supplied.

"At Measandbecks, Haweswater, the observer had been obliged to move the

gauge, and had placed it on ground sloping too precipitously. It was removed a few feet, so as to place it on a level plateau.

"The Matterdale Common and Gowbarrow gauges were not visited, as they were repaired some time previously, and the observer reports them to be in perfect order.

"Owing to the removal from, and subsequent death of, the observer at the Greenside Mines, in Patterdale, the series of observations instituted there, which embraced gauges at 500 ft., 1000 ft., 1500 ft., and 2000 ft., were stopped. Aware of the great importance of accurate observations from that locality, our Secretary visited it, and had the pleasure of finding that the manager of the mines had resumed observations at 1000 feet, the gauge (a very accurate one) being well placed.

"The gauges at Wythburn, Easedale Tarn, and Watendlath, were in perfect order, and the observations made by the observers originally appointed.

"The observer of the gauge at Birkside, Helvellyn, died a few years back, and the gauge had become out of order. The gauge was sent to Keswick for repair, and a new observer instructed in the duties.

"The gauges at Seathwaite were in good order, except the large float one, which was repaired at Keswick.

"A new observer had been appointed to Kirkstone Pass, who consequently had not received personal instruction; neither of his gauges were in perfect order, but both were put so, and the subsequent records are very satisfactory.

"The returns from Skiddaw, though carefully kept, have always been excessively small for the altitude (1677 feet) of the gauge. This is probably due to its very exposed position on the S.W. flank of the mountain. In accordance with a suggestion by the observer (who is on the mountain in all weathers) a second one has been placed on Skiddaw, the new site being at the head of Whitbeck."

Map of Stations in operation.—In consequence of the intimation conveyed to your committee last year, they have discontinued entirely the issue of rain gauges on loan, and have endeavoured to induce gentlemen to purchase gauges for themselves. With a view to determining the districts in which additional gauges are most needed, a map was prepared showing the site of every rain gauge known to be in operation. It was shown from it, that large as is now our field of operation, there are many districts in which all our efforts to obtain observers have been futile. This is especially the case in the West of Ireland.

Gauges along the Highland Railway.—Your Committee are happy to be able to report that the observations by the station agents of this company appear to be carefully and correctly made, but this is another matter which would be much improved if it were possible to provide a travelling inspector. At present the demands upon the time of our Secretary have been such that he has not been able to visit any of these stations, but he is still hoping shortly to do so. With a view of lessening as far as possible the heavy cost of travelling, your Committee purpose applying to the railway companies for a free pass for their Secretary when travelling for such an essentially national purpose.

Rainfall of the British Isles during the year 1872 *and* 1873.—The very exceptional character of the rainfall of 1872 was mentioned in our last report, but in accordance with a custom which has now prevailed for twelve years, it was only incidentally referred to, the details being deferred until the two years 1872 and 1873 could be published together. This course, which was originally adopted with a view to economy in printing, has in the present instance had the fortunate result of bringing together two very remarkable features of each, of which we must speak separately.

Rainfall of 1872.—Records of rainfall have been collected and discussed in our previous reports, which enable us to compare the total fall in any year from 1726 to the present time with the mean fall. One of these tables (that facing page 286 Brit. Ass. Report 1866) contains nine long registers, extending over 140 consecutive years, but the greatest excess even at a single station was only 58 per cent. (at Oxford in 1852). In 1872 this value was largely exceeded at a number of stations, as is shown by Tables I. and II., whence it appears that at 14 stations out of 115, or 12 per cent., it exceeded this previously unparalleled

value. At 13 the excess was greater than 60 per cent., and it reached or exceeded 70 per cent. at the following stations :—

Shropshire, Shiffnal	-	Rainfall	77	per cent. above average 1860–69.
,, Shrewsbury	-	,,	75	,, ,,
,, Hengoed, Oswestry		,,	70	,, ,,
Northumberland, Bywell	-	,,	77	,, ,,
Haddingtonshire, East Linton		,,	70	,, ,,
Aberdeenshire, Braemar	-	,,	78	,, ,,

No similar falls have occurred since 1726, and there is no evidence of such a fall since rainfall observations were commenced, nearly two centuries ago. Full details respecting the monthly fall of rain in this very remarkable year are given in the Appendix to this report, and we think it may be regarded as fortunate that so remarkable a fall has occurred at a period when the system of observation is in a state unprecedentedly near perfection.

The Rainfall of 1873.—If this year had stood by itself it would merely have been classed as a rather dry year, and would have soon passed into oblivion. Coming, however, immediately after such an exceptionally wet year, it has produced the unusual result of giving two consecutive years, one with twice the rainfall of the other, and in many instances with much more than twice. How rare is this occurrence may be judged from the fact that there is no case in the 140 years' table just referred to. The nearest approaches are—Chatsworth, in 1788 19·86 inches, in 1789 36·31, the former being 55 per cent. of the latter. A still nearer approach occurred at Cobham, in Surrey, in 1851 and 1852, when the totals were 17·38 and 34·19 inches respectively, the former, being 51 per cent. of the latter. Nearly 60 cases are quoted in the report, every one of which is more remarkable than either of the above. The districts in which these exceptional ratios occur are (as might be expected) principally those in which the excess in 1872 was greatest, but there are also a few of which the explanation is not so obvious. It is very satisfactory to feel that these two exceptional years have found in the British Isles the most nearly perfect system of observation in the world.

Your Committee cannot close their report without expressing, as far as words can do so, the loss which they have sustained in the death of Professor Phillips, one of the original members appointed in 1865, who, notwithstanding the numerous demands upon his time, was always as willing as he was able to assist the Committee in any of the various difficulties which the extent of their operations inevitably involve.

REPORT OF OBSERVATIONS OF LUMINOUS METEORS DURING THE YEAR 1873-4.

The paper was the work of a Committee of the following gentlemen :—James Glaisher, F.R.S., of the Royal Observatory, Greenwich ; R. P. Greg, F.G.S., F.R.A.S. ; C. Brooke, F.R.S. ; Professor George Forbes, F.R.S.E. ; and Professor A. S. Herschel, F.R.A.S.

Mr. Glaisher proceeded to read the paper, which was an exhaustive report on the subject. Referring to the appearance of luminous meteors during the year 1873-4, the report states that the months in which such phenomena were most abundant were September, December, and January ; in April and June, and again in the last few days of July and beginning of August. Professor Galle's calculations regarding the real cause and probable path of two large meteors which passed over Austria on the 12th and 19th of June last are adverted to, and it is remarked that if a mass of burning sulphur, found on the ground after the disappearance of the later meteor, is not considered meteoric, no occurrence of a fall of ærolites is known to have taken place during the past year. The annual star showers have been carefully watched during the time named ; and, while little important information has been added, the cometary meteor showers of Nov. 14th and 27th, connected with Tempel and Biela's comets, were most remarkable by their non-appearance. After reviewing the principal events which transpired

in connection with the subject under consideration during the past year, the Committee conclude as follows :—Following the method of Dr. Weiss, viz., to calculate the radiant points of those comets of early and recent times whose orbits are believed to pass near the earth, a list of such comets for both the Northern and Southern hemispheres is annexed to Mr. Greg's catalogue, and the cases where they corroborate each other are pointed out. Many important and well-known comets are found to have meteor showers as their present representatives, as would perhaps be still more apparent if more reliable orbits of comets could be used ; but the coincidences are, however, numerous enough, and sufficiently exact to make desirable the further cultivation of cometary astronomy, by the help of star-shower observations.

Mr. Glaisher, F.R.S., having concluded the reading of the report, supplemented it by a few remarks, in which he referred to the assiduous researches of Professor Herschel and the other gentlemen of the Committee.

Professor Herschel followed, and referred at some length to the observations made on meteoric displays by Captain Tupman in the Mediterranean ; he also exhibited the charts drawn by that gentleman, referring to them as a most valuable contribution to the cause of science.

CANNONS AND TEMPESTS.

Mr. R. B. Belcher read a paper, in which he attempted to prove by a long list of coincidences that great battles were usually followed by thunderstorms.

The President (Professor Everett) considered the subject, which was not a new one, well worthy of consideration. In several parts of America the farmers, in order to produce rain, would gather a large quantity of wood and burn it at their respective farms on the same day. He believed that while great battles and fires tended to produce rain, it did not necessarily follow.

Mr. Brooke, Dr. Carpenter, and Mr. Symons, while agreeing that the subject was worth attention, did not believe that rain would necessarily follow from cannonading or large fires.

ON THE CAUSE OF THE PROGRESSIVE MOTIONS OF CYCLONES, AND OF THE SEASONAL VARIATIONS IN THEIR PATHS.

In his paper on the above subject, Dr. Ashe pointed out the importance of arriving at a knowledge of the probable path of cyclones over the ocean, and of the variations which had been found to occur in their paths at different seasons. To trace their paths we must first arrive at a knowledge of the causes of their onward progress. The author resolved these causes into two classes ; those which were inherent in the cyclone itself, and those which depended on the trade-wind, or other general current, within which the cyclone might originate. The resultant of the paths due to these two causes would give the actual path along the surface of the ocean. Now, cyclones were found to move directly to polewards when they were near the tropics, where they were free at once from the influence of the trade-winds and that of the counter-trades, and the author therefore considered that this was the direction of path belonging to the cyclone itself, which he accounted for by supposing that the eastern half of the cyclone had an excess of motor force over the western, in consequence of the air which it drew in from equatorwards adding to the speed of the wind's motion, since it moved eastward faster than the centre, while air from polewards retarded the motion of the western half of the cyclone, since it moved more slowly to eastward than the centre. When the motion of the trade-wind to N.W. in the Southern hemisphere, and to S.W. in the Northern, was added to the proper poleward motion of the cyclone, we arrived at the very path which observation had shown these cyclones to follow. Similarly, the motion of the counter-trades to N.E. in the Northern, and S.E. in the Southern hemisphere gave, when combined with the

poleward motion of the cyclone itself, the exact path observed to be followed outside the tropics. The difference in the force of the trade-wind at different seasons of the year would thus be seen to be the cause of the variations observed in the path of cyclones, and the results so arrived at by this theory were in strict accordance with the facts so observed. Hence the author hoped that a step might be considered gained by this theory towards a knowledge of the probable path of any given cyclone which a mariner might find himself involved in at sea.

ON CYCLONE AND RAINFALL PERIODICITIES IN CONNECTION WITH THE SUNSPOT PERIODICITY.

In the absence of Mr. Charles Meldrum, the author of the above paper, it was read by Mr. J. W. L. Glaisher. The paper commenced by stating that the catalogue of cyclones experienced in the Indian Ocean, from 1847 to 1873, submitted last year, indicated that during that period the number of cyclones in the space between the Equator and 34° S. lat. and the Meridians of 40° E. and 110° E. was much greater in the years of maximum than in the years of minimum sunspot frequency. The author shows that not only the number of cyclones, but their duration, extent, and energy were also much greater in the former than in the latter years, and that there is a strong probability that cyclone fluctuation is consistent with a similar fluctuation of the rainfall over the globe generally.

ON CERTAIN PROTRACTED INEQUALITIES OF ATMOSPHERIC PRESSURE IN THE INDIAN MONSOON REGION, AND THEIR RELATION TO VARIATIONS OF THE LOCAL RAINFALL.

Mr. Henry F. Blandford, F.G.S., in reading his paper on the above subject, drew attention to a fact disclosed by a discussion of the barometric registers for the last seven years, viz., that the abnormal peculiarities of relative pressure distribution, which may appear in any season, tend to last for many months, and in some cases throughout several alternations of the monsoons, throughout variations of pressure even when these are such as accompany monsoons, neighbouring regions are found to maintain a nearly constant difference of pressure which only decays very gradually. In noticing the rainfall, he said that the heaviest was found to be in advance of the centre of the cyclone. A satisfactory determination of their relations cannot be obtained until the pressures in different Indian districts are better known.

MEASURING DEEP WELLS.

To the Editor of the Meteorological Magazine.

SIR,—In your notice of Mr. Lucas' book on "Horizontal Wells," you quote from him his difficulty in measuring deep wells. Having had considerable experience in this matter, the way in which I solved the difficulty may be of use to others. I found that a tape of 100 feet in length frequently was out of order, besides which its length was not sufficient for the deep wells in the chalk. I returned to the use of the ordinary 66 feet tape, and made up the deficiency with fine silk twist. That I first adopted had been used as a fishing line, and was, therefore, properly stretched. I have since that procured a reel of silk (machine twist, No. 32), from Messrs. Pearsalls, in Cheapside, and, after having stretched it both wet and dry, find that it answers its purpose ad-

mirably. Then as for its use. The object is to measure the entire depth of the well, and also to the surface of the water. I have a small float of light wood, 4 or 6 inches square, with a hole pierced in the middle—a red hot poker does this admirably; a pierced leaden bullet, say an ounce weight, such as is used to sink casting nets, is attached to the line, which is passed through the hole in the float. When the float rests on the surface of the water, a little play should be given to the line, which, when raised, the striking of the bullet on the under side of the float, if carefully manipulated, will be easily felt. This will show on the line the depth *to* the water, even if the well be 300 feet deep. Then to find the depth of the water, and the total depth of the well, the line should be allowed to run till the weight, striking the bottom, is felt, as it will be if the line be passed over the forefinger. When the line is drawn up, the difference on the line when it strikes the bottom of the well and the under side of the float will be, of course, *the depth of water* in the well, and the whole line run out will, in the same way, be the *total depth of the well.* Then as to the preparation of the line, so as to fit it for any depth. We have 66 feet in the tape; take two lengths of the silk twist, 50 feet long, and as many more in 100 feet as wanted. Attach a small ring to one end, and a small swivel with a hook—such as used in fishing tackle—to the other end of each length. In use, the 50 feet length will be at the bottom, and its end will be attached to the bullet. If the well is over 66 feet deep, it will require the hook on the upper end of the 50 feet length of twist to be hooked to the ring of the tape, and so on with the other lengths, till the water, or the bottom of the well, is reached. If the line is properly stretched, and the lengths correct, the deepest wells, after a little practice, may be measured by an apparatus easily carried in the pocket.—Yours faithfully,

J. C. CLUTTERBUCK.

Long Wittenham, Sept. 26th, 1874.

A COVERING OF SNOW AS PROTECTION AGAINST FROST.

"Ebermayer gives, in his recent work on the influence of forests, a table of observations showing the temperature of the earth covered by snow during the very cold weather of December, 1871, in Bavaria. The fact has been generally known that snow is the best possible protection against the penetration of frost into the earth, and that it is the natural protection of seeds, young plants, and other vegetation against frost. It is, however, satisfactory to be able to refer to the exact observations made on this subject by Ebermayer, and as an indication of the extent to which snow does protect the earth, it may be stated, for instance, that on the 8th and 12th of December, the temperature of the air at Vienna fell to minus 26°·8 Fahrenheit, while the temperature of the earth beneath the snow was no lower than plus 33°·8, and four feet below it was 42°·8. So long as the snow lies, the variations of temperature under the earth's surface are very slight." —*Public Opinion.*

SEPTEMBER, 1874.

Div.		STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL. Total Fall.	Difference from average 1860–5	Greatest Fall in 24 hours. Dpth	Greatest Fall in 24 hours. Date.	Days on which ·01 or more fell.	TEMPERATURE. Max. Deg.	Max. Date.	Min. Deg.	Min. Date.	No. of Nights below 32°. In shade	No. of Nights below 32°. On grass
			inches	inches.	in.								
I.	ENGLAND.	Camden Town	2·62	+ ·36	·99	30	18	78·2	25	43·3	19	0	0
II.		Maidstone (Linton Park)	3·02	+ ·80	·57	30	15	80·0	26	35·0	18	0	...
,,		Selborne (The Wakes)	2·76	+ ·32	·73	3	14	72·5	25	38·0	14	0	...
III.		Hitchen	3·01	+ 1·15	·91	3	14	68·0	1,25	41·0	9,17	0	...
,,		Banbury	3·21	+ ·84	·72	3	17	72·0	26	40·5	13	0	...
IV.		Bury St. Edmunds (Culford)	3·14	+ 1·53	1·36	3	14	76·0	1	38·0	13§	0	0
V.		Bridport	...	...	...	...	...	...	..	...	...	...	..
,,		Barnstaple	5·93	+ 2·17	·99	3	21	79·0	28	44·0	13	0	...
,,		Bodmin	7·08	+ 3·41	1·18	3	24	72·0	25	46·0	10	0	0
VI.		Cirencester	5·45	+ 2·59	·65	30	17	...	...	...	...	...	...
,,		Shifnal (Haughton Hall)	2·88	+ ·93	·68	30	20	69·0	25	42·0	14	0	...
,,		Tenbury (Orleton)	3·67	+ ·99	·55	30	17	75·3	25	40·3	14	0	0
VII.		Leicester (Wigston)	2·79	+ ·58	·90	16	18	...	...	...	...	...	...
,,		Boston	2·43	+ ·86	·79	16	10	74·0	1,27	45·0	10	0	...
,,		Grimsby (Killingholme)	1·91	...	·55	30	14	72·0	1	42·0	14	0	...
,,		Derby	2·74	+ ·40	·45	15	18	71·0	25 ‖‖	41·0	14	0	...
VIII.		Manchester	3·86	+ ·17	·50	8,30	21	76·0	27	41·2	14‖	0	0
IX.		York	2·85	+ ·52	·63	8	15	71·0	27	41·0	9	0	..
,,		Skipton (Arncliffe)	7·19	+ 2·23	1·59	11	24	70·0	27	32·0	13	0	...
X.		North Shields	1·76	+ ·06	·47	11	12	67·0	1	41·0	14	0	...
,,		Borrowdale (Seathwaite)	16·06	+ 2·85	1·80	15	23	...	...	...	...	...	...
XI.	WALES.	Cardiff (Ely)	6·05	+ 2·30	·88	9	17	...	...	...	...	...	...
,,		Haverfordwest	4·47	+ ·76	·80	8	14	69·0	26	35·0	13	0	...
,,		Rhayader (Cefnfaes)	4·65	+ ·81	1·00	9	19	71·0	...	37·0	...	0	...
,,		Llandudno	2·53	+ ·19	·67	30	17	74·3	27	45·0	14	0	...
XII.	SCOTLAND.	Dumfries	3·30	+ ·57	·83	21	25	64·5	1,2	36·0	14	0	...
,,		Hawick (Silverbut Hall)	3·33	...	·65	21	19	...	...	...	...	...	...
XIV.		Kilmarnock (Annanhill)	5·41	...	1·05	10	24	64·0	1,21	38·6	17	0	...
XV.		Castle Toward	6·91	+ 2·29	1·00	22	25	63·5	9	...	...	...	...
XVI.		Leven (Nookton)	2·48	0·00	·55	21	17	66·0	1,3*	34·0	17	0	4
,,		Stirling (Deanston)	...	...	...	...	...	..	...	...	...	...	...
,,		Logierait	3·80	...	·63	21	16	...	...	..	...	...	...
XVII.		Braemar	3·34	+ ·70	·48	21	23	60·3	15	32·3	6	0	1
,,		Aberdeen	2·14	...	·54	21	17	66·2	1	36·3	17	0	2
XVIII		Loch Broom	4·28	...	·69	3	26	...	...	...	...	...	..
,,		Portree	13·74	+ 2·98	2·49	14	30	...	...	...	...	...	...
,,		Inverness (Culloden)	2·73	+ ·04	·74	12	25	68·4	1	39·0	13	0	0
XIX.		Helmsdale	4·63	...	1·02	2	19	...	...	...	...	...	...
,,		Sandwick	4·86	+ 1·20	·91	28	26	61·0	2	39·0	7	0	0
XX.	IRELAND.	Caherciveen Darrynane Abbey	5·19	...	·78	28	21	...	...	...	...	...	..
,,		Cork	3·36	...	·75	20	20	...	...	...	...	...	...
,,		Waterford	3·37	+ ·24	·66	28	19	67·0	26	42·0	10¶	0	...
,,		Killaloe	5·15	+ ·99	·79	28	19	70·0	25†	...	...	...	...
XXI.		Portarlington	3·51	+ ·23	·57	29	27	68·0	25	38·5	29	0	...
,,		Monkstown, Dublin	1·59	— ·40	·53	21	10	...	...	...	...	...	...
XXII.		Galway	4·00	...	1·06	23	16	76·0	8	33·0	11**	0	...
,,		Ballyshannon	4·77	...	·63	9	21	...	...	...	...	...	...
XXIII		Waringstown	2·92	...	·70	29	17	68·0	1‡‡	34·0	30	0	1
,,		Edenfell (Omagh)	4·33	...	·71	21	21	61·0	15‡	35·0	7	0	...

* And 4. † 27 & 28. ‡ 16, 24, & 25. § 18. ‖ 15. ¶ 30. ** 26.
‖‖ And 27. ‡‡ 28 & 29.
+Shows that the fall was above the average; —that it was below it.

METEOROLOGICAL NOTES ON SEPTEMBER.

ABBREVIATIONS.—**Bar. for Barometer; Ther. for Thermometer; Max. for Maximum; Min. for Minimum; T for Thunder; L for Lightning; T S for Thunderstorm; R for Rain; H for Hail; S for Snow.**

ENGLAND.

LINTON.—First twelve days mostly dull and showery, afterwards dry till 28th, the 25th, 26th, and 27th being very warm, dry, and sunny, equalling those in July. Brisk winds on 22nd and 29th; T on 23rd, 28th, and 30th, with heavy rain on the last-named day. On the whole a fine growing month, but, except the few days alluded to, not a bright or sunny one.

SELBORNE.—Tempestuous weather on 1st, T at 3 a.m.; L on 9th at 10 p.m., and at 10.50 p.m. on 28th; fogs on 16th, 17th, 24th, 25th, 27th, 28th, and 29th. A fine harvest month, hops very few in this neighbourhood. Prevailing winds S.W.

CULFORD.—A month of genial growing weather, westerly winds prevailing during 25 days. The maximum temperature of the month (76°) was on the 1st, and the mean temperature 57°·3. T on 9th and on the night of the 30th. On the 3rd 1·36 in. of rain fell.

BODMIN.—Average bar. of month 29·92; average temperature 59°·7. Rainfall more than 3 inches in excess of the average of the last 25 years.

ORLETON.—Much rain fell on the first eleven days and on the last three, the remainder of the month was fine and pleasant, and very warm from the 22nd to the 28th. The mean temperature of the month was above the average; a favourable month for closing the harvest. Distant T was heard on the 2nd and 10th. Violent wind on the 22nd.

GRIMSBY.—T, L, and R at 1·30 on the 2nd, with strong squall; T at 3 p.m. on 10th; T at 12.45 p.m. on 24th. A warm dry month. The potato crop splendid and more free from disease than for many years past. A welcome rain on the night of the 30th.

NORTH SHIELDS.—T S on the 2nd.

SEATHWAITE.—Six days on which the fall of R exceeded an inch, on five of those days it exceeded or nearly reached 1¼ in. T S on 2nd, 9th, and 21st. Total fall during the month, 16 inches.

WALES.

LLANDUDNO.—Weather very variable, but the latter half of the month very fine. T on 2nd.

SCOTLAND.

DUMFRIES.—Only five days without rain, but it was heavy only on six days, and as it was generally followed by strong drying winds, the harvest was less impeded than was expected; by the third week the crops were generally secured in good condition. The month closed with much R and T S. T on 2nd, 3rd, 21st, and 29th. Mean temperature more than 3° above the average.

HAWICK.—A wet and slow harvest month; sharp frost on the 13th. Potatoes are looking pretty sound and free from disease; turnips looking well.

CASTLE TOWARD.—A wet disagreeable month, only 5 days without R, and but little sun; prevailing winds W. and S.W.; heavy gales occasionally from the W.; T on 1st, 2nd, and 9th. Corn crops in this quarter are later than in other districts; a good quantity standing to cut, and little or nothing has been put in stack-yard, and to all appearance no hopes of the weather improving, as the rain still continues; shocks in fields are getting green. Cattle of all kinds healthy, and pastures abundant.

NOOKTON.—L at 9 p.m. on 2nd.

BRAEMAR.—A genial month, but very unsettled. T S on 1st, meteor seen on 9th.

ABERDEEN.—Lochnagar white with snow on 5th. The month has been slightly above the average in temperature, with a deficiency in the rainfall. A low barometer, and strong wind.

LOCH BROOM.—Too wet a month for harvest operations; precisely the same number of wet days as in the last month, which contributed very much to retard and injure the cereals, but may have, in a measure, prevented the spread of the potato disease, which at one time was very threatening.

PORTREE.—The wettest September on record, except 1863, when the fall was 13·76. The crops are in a very sad state, much of the corn is still uncut, and the stalks are quite bleached, the straw quite destroyed; the hay crop is also unsecured, and much of it is rotting on the ground; the potatoes are also suffering from the wet, but not from disease. Cattle and sheep healthy.

SANDWICK.—September has been much wetter than the average of the last 33 years, indeed its rainfall has never been exceeded in any September during that time, except in 1847. T and L on 1st and 29th; aurora on 10th. Eleven swans were seen returning on the 28th. Grain crops are nearly all cut.

IRELAND.

DARRYNANE.—Very changeable showery month, prevailing wind N.W.; H on 9th; T on 22nd. Potatoes being lifted fast in this neighbourhood, and generally a very good crop, very little blight; rest of harvest very backward.

WATERFORD.—21st, great storm during the night and early morning; thick fog on 25th and 26th.

BALLYSHANNON.—The month has been marked by frequent falls of heavy R, and very high winds. This has seriously retarded the completion of the grain and hay harvest in this neighbourhood. Strong gale from N.E. on 9th.

WARINGSTOWN.—A fine, seasonable month. Harvest operations all satisfactorily finished in this neighbourhood.

EDENFELL, OMAGH.—With the exception of a few fine intervals of short duration, the weather of the month has been wet, inclement, and very unfavourable for harvesting grain, a fine crop of which yielded to the sickle, but is still out in stack, and in some danger.

SUPPLEMENTARY TABLE OF MONTHLY RAINFALL, SEPTEMBER, 1874.

Div.	County.	Station.	Total Fall.
			in.
II.	Kent	Margate (Acol)	2·85
,,	Sussex	Hailsham	4·30
,,	Hampshire	Strathfield Turgiss	3·32
III.	Oxford	Oxford (Magdalen College)	3·16
,,	Cambridge	Cambridge (Merton Villa)	2·81
IV.	Essex	Harlow (Sheering Rectory)	2·23
,,	Norfolk	Swaffham	2·77
V.	Devon	Teignmouth (Brookbank)	5·06
,,	,,	Torrington (Langtree)	6·03
,,	Somerset	Taunton (The Castle)	5·87
VII.	Lincoln	Horncastle (Bucknall)	1·87
VIII.	Lancashire	Liverpool (Walton-on-the-Hill)	2·42
IX.	York	Wakefield (Stanley Vicarage)	1·76
X.	Durham	Gainford	2·82
,,	Westmoreland	Shap	6·56
XVII.	Banff	Keith	2·79
XVIII.	West Ross	Strathconan	4·71
XX.	Cork	Fermoy (Glenville)	4·37
XXI.	Westmeath	Athlone (Twyford)	4·52
XXII.	Galway	Ballinasloe	—

FINE METEOR.

To the Editor of the Meteorological Magazine.

SIR,—A remarkable appearance was seen by me at 8.50 last evening. There seemed to be a beautiful flash of sheet lightning, but which I expect was the light from a meteor, as immediately afterwards there was a bright light, like a comet with two tails, near the Pole Star, which I thought was the comet which we have heard was to be seen. This continued two or three minutes, and the tail seemed to draw up to the disc, and at last disappeared. I hope it was observed by others, and that we shall hear more about it.

Yours very truly,

J. NUTTER.

Cambridge, Oct. 12th, 1874.

[The above was undoubtedly a fine meteor; our assistant saw it from Camden Square, and reported as follows: "At 8.50 p.m. on the 11th, a single bright flash of light from N.E., apparently at a considerable altitude. I was going south-westward, and immediately turned to see its origin, but the sky was nearly overcast, and I saw nothing more." We were at Brighton, and walking westward with Mr. Sawyer, F.M.S., when both saw the light, and we instantly exclaimed, "Oh, what a fine meteor!" It was too cloudy to see anything, except that the light came from between E. and N., and that the time by our pocket "E. J. Dent" was 8h. 51m. 0s.—ED.]

NEW METEOROLOGICAL STATIONS.

We understand that the Meteorological Society are taking steps to organize a small number of observing stations of the second order, at which all the arrangements are to be as nearly identical as possible; where no instrument is to be employed until its correction has been determined and recorded at the Society's office; where the observations are to be made daily with the strictest punctuality at 9 a.m. and 9 p.m., local time; and where, in short, every care will be taken to secure observations of the best quality obtainable, without exceptional demands upon either the time or the purses of the observers. We believe that the Society have already received several offers of assistance, and we are sure that any others promptly submitted to the assistant secretary would be carefully considered by those who have charge of the organization.